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Internet-Based Intervention for Posttraumatic Stress Disorder: Using Remote Imagery Rehearsal Therapy to Treat Nightmares

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Imagery Rehearsal Therapy (IRT), a cognitive therapy consisting in positively transforming nightmares into dreams with a more positive content, developed by Barry Krakow [1], is the most effective treatment for chronic nightmares [2]. Recently, Gieselmann et al. [3] validated the feasibility of using telemedicine-delivered IRT for idiopathic nightmares. Their sound methodology demonstrates how internet-based intervention, with minimal guidance from a coach, can be effective. However, their "results cannot be generalized to posttraumatic nightmares due to the strict selection criteria enforced by ethical obligations." Nightmares affect the majority of patients suffering from Posttraumatic Stress Disorder (PTSD) and occur twice as frequently in PTSD than in any other psychiatric disorders [4]. While telepsychology is known to offer moderate to large improvements in the treatment of PTSD [5], no study on remote IRT for the treatment of traumatic nightmares has yet been published.

The main objective of the current study was to generalize the results of previous remote IRT studies [3, 6] to traumatic nightmares including those experienced in PTSD. This study implemented a pre-post design comprising baseline, post-treatment (3 months after treatment), and follow-up measurements (6 months after treatment). A videoconference interview was conducted for diagnosis (Mini-International Neuropsychiatric Interview according to DSM-IV-TR). Exclusion criteria were: exposure to a traumatic event over a period of less than 3 months, following treatment for PTSD, psychosis, night terrors, sleepwalking, sleep paralysis, narcolepsy, sleep-disordered breathing, neurological disorders, or significant modification of consumption of substances influencing dreams during the study (hypnotics, beta-blockers, neuroleptic drugs, antidepressants, and alcohol).

The remotely administered treatment complied with recommended formatting for practicing IRT [7] and was divided into 4 training sessions including teaching videos, exercises to practice at home and 4 face-to-face videoconferences with a psychologist. The first two sessions focused on cognitive restructuring of dysfunctional beliefs about nightmares, the third was dedicated to practicing visual mental imagery and managing intrusive images, and the fourth to transforming nightmares into dreams: participants were instructed to transform one nightmare per week without interacting with their psychologist, which could take up to 3 months, depending on the number of nightmares.

Participants completed questionnaires before, then 3 and 6 months after treatment: the Nightmare Frequency Questionnaire (NFQ), Nightmare distress (Sleep-50), Pittsburgh Sleep Quality

Index (PSQI), Insomnia Severity Index (ISI), White Bear Suppression Inventory (WBSI), and Pichot Depression Scale (QD2A). The patients' perceived mastery over their nightmares was measured using the Specific Self-Efficacy Scale (SSES). The Working Alliance Inventory-Short Revised (WAI-SR) was completed during followup. Only patients whose nightmares had begun following a traumatic event completed the Post-Traumatic Stress Disorder Checklist Scale (PCLS) and Impact of Events Scale-Revised (IES-R).

All statistical analyses were carried out using Statistica v7.1.
Three analyses of variance with repeated measurements including the intra-individual factor "Phase" (pre-treatment, post-treatment, and follow-up) were separately run on 3 interindividual factors: "Pathology" (with PTSD, n = 20, of which 10 with severe PTSD IES-R >53; without PTSD, n = 28), "Origin" (chronic nightmares following a traumatic event, n = 33; without traumatic event, n = 15), and "Type of trauma" (abuse during childhood, n = 11; sexual or physical assault, n = 11; road accident, n = 11). The sample size was determined with normal approximation using the z statistic for effect size [8]. Two hundred and three individuals were pre-registered and 127 assessed for eligibility, of which 67 individuals were retained for inclusion. Among these, 48 participants (36 ± 12 years, 83% women) completed the study and all questionnaires. Prior to the program, significant differences between participants with and without PTSD were found for sleep deterioration ($p = 0.03$) and depression ($p = 0.01$) (see suppl. data). PTSD severity (IES-R: $p = 0.003$; PCLS: $p = 0.001$) and effort of suppression ($p = 0.014$) were worse for patients who had been abused during childhood. Thought intrusion ($p = 0.04$) was weaker for road accident participants. The "Origin" factor was not significant before treatment.
The findings indicate that all outcomes improved between pretreatment and post-treatment (see online suppl. data). No significant difference was observed between post-treatment and followup. Effect sizes were comparable to face-to-face settings [8]: remote IRT reduced numbers of nights with nightmares ($p < 0.001$,$d = 1.32$), and sleep disturbance ($p < 0.001$, $d = 0.9$). 70% of participants experienced less than 3 nightmares per month at followup (it is below the pathological threshold). IRT also reduced insomnia ($p < 0.001$, $d = 0.98$): complete remission was observed in 33% of the 42 patients who had insomnia at inclusion. Remote IRT also reduced intrusive thoughts ($p < 0.001$, $d = 0.57$), suppression efforts ($p < 0.001$, $d = 0.27$), depression ($p = 0.008$, $d = 0.35$), and induced an increased feeling of control over dreams ($p < 0.001$, $d = 0.9$).
Analysis of variance showed no significant interaction between the "Phase" and "Traumatic" factors. Remote IRT was as effective for PTSD patients as for nonpsychiatric participants. Whether the nightmares had begun following a traumatic event or not, and whatever the type of trauma, the clinical improvements were comparable. Remote IRT reduced all symptoms of PTSD (PCLS: $p < 0.001$, $d = 0.37$; IES-R: $p = 0.006$, $d = 0.48$) with the exception of avoidance ($p > 0.05$). Half of the PTSD patients reached a subpathological level by the end of treatment. The intensity of traumatic symptoms experienced by PTSD participants was reduced by an average of 25 ± 25%. The therapeutic alliance was equivalent for both groups.
In conclusion, this study enables us to generalize the positive results obtained from other telemedicine IRT studies on idiopathic nightmares [3, 6] to traumatic nightmares with or without PTSD. According to the results, internet-based imagery rehearsal intervention combined with 4 videoconferences with a psychologist constitutes an effective first step, without any geographical constraints, in the treatment of PTSD patients.

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Statement of Ethics

The methodology respected sound ethical practice (French Clinical Trials Register: ANSM-2014-A00778-39; French Ethical Authorization: CPP No. 2014-A00778-39; Data Protection Authorization: CNIL No. 1612473).

Disclosure Statement

The authors declare no conflict of interest.

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